PATENT COOPERATION TREATY

From the INTERNATIONAL BUREAU

PCT

NOTIFICATION OF TRANSMITTAL
OF COPIES OF TRANSLATION
OF THE INTERNATIONAL PRELIMINARY REPORT
ON PATENTABILITY
(CHAPTER I OR CHAPTER II
OF THE PATENT COOPERATION TREATY)
(PCT Rules 44*bis*.3(c) and 72.2)

To:

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JAPON

07

Date of mailing *(day/month/year)* 31 August 2006 (31.08.2006)	
Applicant's or agent's file reference FP04-0460-00	**IMPORTANT NOTIFICATION**
International application No. PCT/JP2004/019566	International filing date *(day/month/year)* 27 December 2004 (27.12.2004)
Applicant HAMAMATSU PHOTONICS K.K. et al	

1. **Transmittal of the translation to the applicant.**

☑ The International Bureau transmits herewith a copy of the English translation of the international preliminary report on patentability (Chapter I).

☐ The International Bureau transmits herewith a copy of the English translation of the international preliminary report on patentability (Chapter II).

2. **Transmittal of the copy of the translation to the designated or elected Offices.**

The International Bureau notifies the applicant that copies of that translation have been transmitted to the following designated or elected Offices requiring such translation:

None

The following designated or elected Offices, having waived the requirement for such a transmittal at this time, will receive copies of that translation from the International Bureau only upon their request:

AE, AG, AL, AM, AP, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EA, EC, EE, EG, EP, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OA, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SM, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW

3. **Reminder regarding translation into (one of) the official language(s) of the elected Office(s).**

The applicant is reminded that, where a translation of the international application must be furnished to an elected Office, that translation must contain a translation of any annexes to the international preliminary report on patentability (Chapter II).

It is the applicant's responsibility to prepare and furnish such translation directly to each elected Office concerned within the applicable time limit (Rule 74.1). See Volume II of the PCT Applicant's Guide for further details.

The International Bureau of WIPO 34, chemin des Colombettes 1211 Geneva 20, Switzerland Facsimile No. +41 22 338 82 70	Authorized officer Masashi Honda Facsimile No. +41 22 338 82 70

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Form PCT/IB/338 (January 2004)

PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY
(Chapter I of the Patent Cooperation Treaty)

(PCT Rule 44*bis*)

Applicant's or agent's file reference FP04-0460-00	**FOR FURTHER ACTION**	See item 4 below
International application No. PCT/JP2004/019566	International filing date *(day/month/year)* 27 December 2004 (27.12.2004)	Priority date *(day/month/year)* 07 January 2004 (07.01.2004)
International Patent Classification (8th edition unless older edition indicated) See relevant information in Form PCT/ISA/237		
Applicant HAMAMATSU PHOTONICS K.K.		

1. This international preliminary report on patentability (Chapter I) is issued by the International Bureau on behalf of the International Searching Authority under Rule 44 *bis*.1(a).

2. This REPORT consists of a total of 6 sheets, including this cover sheet.

   In the attached sheets, any reference to the written opinion of the International Searching Authority should be read as a reference to the international preliminary report on patentability (Chapter I) instead.

3. This report contains indications relating to the following items:

- ☒ Box No. I — Basis of the report
- ☐ Box No. II — Priority
- ☐ Box No. III — Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- ☒ Box No. IV — Lack of unity of invention
- ☒ Box No. V — Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- ☐ Box No. VI — Certain documents cited
- ☐ Box No. VII — Certain defects in the international application
- ☐ Box No. VIII — Certain observations on the international application

4. The International Bureau will communicate this report to designated Offices in accordance with Rules 44*bis*.3(c) and 93*bis*.1 but not, except where the applicant makes an express request under Article 23(2), before the expiration of 30 months from the priority date (Rule 44*bis* .2).

	Date of issuance of this report 22 August 2006 (22.08.2006)
The International Bureau of WIPO 34, chemin des Colombettes 1211 Geneva 20, Switzerland Facsimile No. +41 22 338 82 70	Authorized officer Masashi Honda e-mail: pt08@wipo.int

Form PCT/IB/373 (January 2004)

PATENT COOPERATION TREATY

TRANSLATION

From the
INTERNATIONAL SEARCHING AUTHORITY

To:

PCT

WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY

(PCT Rule 43*bis*.1)

	Date of mailing *(day/month/year)*
Applicant's or agent's file reference **FP04-0460-00**	**FOR FURTHER ACTION** See paragraph 2 below

International application No.	International filing date *(day/month/year)*	Priority date *(day/month/year)*
PCT/JP2004/019566	27.12.2004	07.01.2004

International Patent Classification (IPC) or both national classification and IPC

Applicant
HAMAMATSU PHOTONICS K.K.

1. This opinion contains indications relating to the following items:

- ☒ Box No. I — Basis of the opinion
- ☐ Box No. II — Priority
- ☐ Box No. III — Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- ☒ Box No. IV — Lack of unity of invention
- ☒ Box No. V — Reasoned statement under Rule 43*bis*.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- ☐ Box No. VI — Certain documents cited
- ☐ Box No. VII — Certain defects in the international application
- ☐ Box No. VIII — Certain observations on the international application

2. **FURTHER ACTION**

If a demand for international preliminary examination is made, this opinion will be considered to be a written opinion of the International Preliminary Examining Authority ("IPEA") except that this does not apply where the applicant chooses an Authority other than this one to be the IPEA and the chosen IPEA has notified the International Bureau under Rule 66.1*bis*(b) that written opinions of this International Searching Authority will not be so considered.

If this opinion is, as provided above, considered to be a written opinion of the IPEA, the applicant is invited to submit to the IPEA a written reply together, where appropriate, with amendments, before the expiration of 3 months from the date of mailing of Form PCT/ISA/220 or before the expiration of 22 months from the priority date, whichever expires later.

For further options, see Form PCT/ISA/220.

3. For further details, see notes to Form PCT/ISA/220.

Name and mailing address of the ISA/JP	Authorized officer
Facsimile No.	Telephone No.

WRITTEN OPINION OF THE INTERNATIONAL SEARCHING AUTHORITY

International application No.
PCT/JP2004/019566

Box No. I Basis of this opinion

1. With regard to the language, this opinion has been established on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.

☐ This opinion has been established on the basis of a translation from the original language into the following language _____, which is the language of a translation furnished for the purposes of international search (under Rule 12.3 and 23.1(b)).

2. With regard to any nucleotide and/or amino acid sequence disclosed in the international application and necessary to the claimed invention, this opinion has been established on the basis of:

a. type of material

☐ a sequence listing

☐ table(s) related to the sequence listing

b. format of material

☐ in written format

☐ in computer readable form

c. time of filing/furnishing

☐ contained in the international application as filed.

☐ filed together with the international application in computer readable form.

☐ furnished subsequently to this Authority for the purposes of search.

3. ☐ In addition, in the case that more than one version or copy of a sequence listing and/or table(s) relating thereto has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that in the application as filed or does not go beyond the application as filed, as appropriate, were furnished.

4. Additional comments:

WRITTEN OPINION OF THE INTERNATIONAL SEARCHING AUTHORITY

International application No.
PCT/JP2004/019566

Box No. IV Lack of unity of invention

1. ☐ In response to the invitation (Form PCT/ISA/206) to pay additional fees the applicant has:

   ☐ paid additional fees

   ☐ paid additional fees under protest

   ☐ not paid additional fees

2. ☒ This Authority found that the requirement of unity of invention is not complied with and chose not to invite the applicant to pay additional fees.

3. This Authority considers that the requirement of unity of invention in accordance with Rules 13.1, 13.2 and 13.3 is

   ☐ complied with

   ☒ not complied with for the following reasons:

A common feature of the inventions of claims 1-8, 9-10, 11-13, 14-18, 19-20 is in "a glass substrate that is optically transparent with respect to light is fixed to the light outgoing surface via a film comprising silicon oxide".

However, the search results demonstrated that the feature of "a glass substrate that is optically transparent with respect to light is fixed to the light outgoing surface via a film comprising silicon oxide" is disclosed in [JP 2002-158373 A (United Epitaxy Co., Ltd.), 31 May 2002, Full text, all drawings], and therefore does not appear to possess novelty.

As a result, the feature of "a glass substrate that is optically transparent with respect to light is fixed to the light outgoing surface via a film comprising silicon oxide" is within the scope of prior art and therefore this common feature is not a special technical feature in the meaning of PCT Rule 13.2(ii).

For this reason, the inventions of claims 1-8, 9-10, 11-13, 14-18, and 19-20 do not have a common feature, and a technical link in the meaning of PCT Rule 13 cannot be found between those different inventions. Therefore, the inventions of claims 1-8, 9-10, 11-13, 14-18, and 19-20 do not satisfy the requirement of the unity of inventions.

4. Consequently, this opinion has been established in respect of the following parts of the international application:

   ☒ all parts

   ☐ the parts relating to claims Nos. _____

WRITTEN OPINION OF THE INTERNATIONAL SEARCHING AUTHORITY

International application No.
PCT/JP2004/019566

Box No. V **Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**

1. Statement

Novelty (N)	Claims	2-10, 14-20	YES
	Claims	1, 11-13	NO
Inventive step (IS)	Claims		YES
	Claims	1-20	NO
Industrial applicability (IA)	Claims	1-20	YES
	Claims		NO

2. Citations and explanations:

Document 1: JP 2002-15873 A (United Epitaxy Co., Ltd.), 31 May 2002, Full text, all drawings
Document 2: JP 2002-368334 A (Seiko Epson Corp.), 20 December 2002, Full text, all drawings
Document 3: JP 11-168262 A (Canon Inc.), 22 June 1999, Par. No. 0010, Fig. 1
Document 4: JP 6-326353 A (Motorola Inc.), 25 November 1994, Par. No. 0019, Fig. 6
Document 5: JP 8-255933 A (Ohmron Corp.), 01 October 1996, Full text, all drawings
Document 6: JP 11-154774 A (Canon Inc.), 08 June 1999, Full text, all drawings
Document 7: JP 8-111559 A (Hitachi Ltd.), 30 April 1996, Full text, all drawings
Document 8: JP 2002-353564 A (Seiko Epson Corp.), 06 December 2002, Full text, all drawings
Document 9: JP 2002-280614 A (Citizen Electronics Co., Ltd.), 27 September 2002, Full text, all drawings
Document 10: JP 2002-185071 A (Samsung Electronics Co., Ltd.), 28 June 2002, Full text, all drawings

Claims 1, 11-13: Document 1

Document 1 cited in the ISR describes a light-emitting diode in which a LED epitaxial structural body is adhesively bonded to a transparent substrate such as glass by using a transparent adhesive material such as spin-on-glass and also describes a method for manufacturing such a diode. Furthermore, this document describes that after the LED epitaxial structural body has been adhesively bonded to the transparent substrate, the semiconductor substrate is wet etched to an etching stop layer and that the etching stop layer is then removed by wet etching. Therefore, the inventions of claims 1, 11-13 do not appear to possess novelty or involve an inventive step.

International application No.
PCT/JP2004/019566

Supplemental Box

In case the space in any of the preceding boxes is not sufficient.

Continuation of: Box V

Claims 2-6. 14-17: Documents 1, 2

Document 2 cited in the ISR describes a surface light emission layer in which a p-type contact layer, a p-type DBR mirror layer, a p-type clad layer, an active layer, a n-type clad layer, a current constriction layer, a n-type DBR mirror layer, and a n-type contact layer are formed on a substrate, a recess is formed as far as the p-type contact layer by etching to form a light-emitting section and a reinforcing section, and an insulating layer is formed on the current constriction layer of the light-emitting section and also describes a method for the manufacture of such laser. Furthermore, this document also describes that ohmic electrodes are formed on the light-emitting section and reinforcing section and that the ohmic electrode on the reinforcing section is connected electrically to the p-type contact layer. This document also describes that stud bumps are formed on the ohmic electrodes. Therefore, using the structure of the surface light emission laser and the method for manufacturing the same that are described in document 2 in the light-emitting diode and method for manufacturing the same that are described in document 1 would be obvious to a person skilled in the art.

Claim 7: Documents 1-3

Document 3 cited in the ISR describes a surface light emission device in which surface light emission layers in which a multiple quantum well active layer is narrowed by the DBR layers and an electron constriction structure is formed in an embedded layer are arranged as a two-dimensional array. Therefore, using the structure of the surface light emission layer described in document 2 in the light-emitting diode of document 1 and creating a two-dimensional array as described in document 3 would be obvious to a person skilled in the art.

Claims 8, 18: Documents 1, 2, 4

Document 4 cited in the ISR describes a LED formed by fixedly attaching a LED to a protective light transmitting substrate such as glass with a light transmitting pressure-sensitive adhesive layer and forming a reflecting layer by vapor depositing an electric contact material on the top of LED and the entire side surface thereof. This document also describes a method for the manufacture of such LED. As also described in document 3, forming a reflective film on the LED represents well-known technology, and using the structure of the surface light emission layer and method for manufacture thereof that are described in document 2 and also using this well-known technology in the light-emitting diode and method for manufacture thereof that are described in document 1 would be obvious to a person skilled in the art.

Claims 9, 10, 19, 20: Documents 1, 5

Document 5 cited in the ISR describes a semiconductor light-emitting element in which a glass substrate is joined to the surface of a semiconductor light-emitting element and a concave lens is formed on the glass substrate and also describes a method for the manufacture of such semiconductor light-emitting element. Therefore, using a semiconductor light-emitting element in which a concave lens is formed on the glass substrate and a method for the manufacture thereof that are described in document 2 in the light-emitting diode and a method for the manufacture thereof that is described in document 1 would be obvious to a person skilled in the art.